

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

- 1 1. (Original) An apparatus comprising:
 - 2 a switch comprising microelectromechanical elements, the microelectromechanical
 - 3 elements comprising:
 - 4 a sealed chamber containing a dielectric element; and
 - 5 conductors in the sealed chamber,
 - 6 wherein the conductors are arranged such that application of greater than a
 - 7 predetermined voltage causes ionization breakdown of the dielectric element to provide an
 - 8 electrically conductive path between the conductors.
- 1 2. (Currently Amended) The apparatus of claim 1, wherein the dielectric element in the
2 ~~sealed chamber~~ contains comprises at least one of argon, neon, helium, xenon, nitrogen, oxygen,
3 and air.
- 1 3. (Currently Amended) The apparatus of claim 2, wherein the dielectric element in the
2 ~~sealed chamber~~ contains comprises a mixture of at least any two of argon, neon, helium, xenon,
3 nitrogen, oxygen, and air.
- 1 4. (Original) The apparatus of claim 1, further comprising a substrate and a cover, wherein
2 the conductors are arranged on the substrate,
3 wherein the cover, substrate, and conductors define the sealed chamber.
- 1 5. (Original) The apparatus of claim 4, wherein the microelectromechanical elements
2 further comprise sealing elements provided between a surface of the cover and surfaces of the
3 conductors to provide the sealed chamber.
- 1 6. (Original) The apparatus of claim 4, wherein the dielectric element comprises at least
2 one of a dielectric gas and a dielectric liquid.

1 7. (Original) The apparatus of claim 6, wherein the microelectromechanical elements
2 further comprise a dielectric layer formed over the conductors in the sealed chamber, the
3 dielectric layer having plural openings adjacent respective conductors to provide discharge paths
4 from the conductors through the at least one of the dielectric gas and dielectric liquid contained
5 in the sealed chamber.

1 8. (Original) The apparatus of claim 1, wherein the microelectromechanical elements
2 further comprise nanotube electron emitters placed on the conductors in the sealed chamber
3 chambers.

1 9. (Currently Amended) The apparatus of claim [[1]] 8, wherein the
2 ~~microelectromechanical elements further comprise~~ nanotube electron emitters ~~placed on the~~
3 ~~conductors in the sealed chambers~~ comprise carbon nanotube electron emitters.

1 10. (Original) The apparatus of claim 8, wherein the nanotube electron emitters comprise
2 boron nanotube electron emitters.

1 11. (Original) The apparatus of claim 1, wherein the conductors each has a curved side, the
2 curved sides of the conductors facing each other across a portion of the sealed chamber.

1 12. (Original) The apparatus of claim 1, wherein the microelectromechanical elements
2 further comprise a trigger electrode to receive a pulsed signal to cause breakdown of the
3 dielectric element in the sealed chamber.

1 13. (Original) The apparatus of claim 12, wherein the trigger electrode is within the sealed
2 chamber.

1 14. (Original) The apparatus of claim 12, wherein the trigger electrode is outside the sealed
2 chamber but in the proximity of the sealed chamber.

- 1 15. (Currently Amended) The apparatus of claim 1, further comprising:
2 an initiator electrically connected to the switch.
- 1 16. (Original) The apparatus of claim 15, further comprising a local energy source to provide
2 the predetermined voltage to the switch.
- 1 17. (Original) The apparatus of claim 15, wherein the initiator comprises at least one of an
2 exploding foil initiator, an exploding bridgewire initiator, and a semiconductor bridge initiator.
- 1 18. (Original) The apparatus of claim 1, further comprising a substrate, the conductors
2 formed on a surface of the substrate, wherein at least a portion of the sealed chamber is between
3 sides of the conductors.
- 1 19. (Original) The apparatus of claim 1, wherein the dielectric element comprises at least
2 one of a dielectric gas and dielectric liquid.
- 1 20. (Original) The apparatus of claim 19, further comprising a housing in which the switch is
2 located, the housing providing the sealing for the sealed chamber.
- 1 21. (Original) The apparatus of claim 1, further comprising a radioactive material in the
2 proximity of the switch to enhance predictability in the ionization breakdown of the dielectric
3 element.
- 1 22. (Original) The apparatus of claim 21, wherein the radioactive material is provided in the
2 sealed chamber.
- 1 23. (Original) The apparatus of claim 21, wherein the radioactive material comprises at least
2 one of Chromium, Thorium, Potassium, Uranium, Nickel, and a mineral containing a proportion
3 of Chromium, Thorium, Potassium, Uranium, and Nickel.

1 24. (Original) The apparatus of claim 21, wherein the radioactive material comprises at least
2 one of Thorite, Uranite, and a rock salt.

1 25. (Currently Amended) A switch comprising:
2 electrical conductors; and
3 a dielectric material between the conductors,
4 wherein each of the conductors has a curved side, the curved sides of the conductors
5 facing each other across the dielectric material, wherein the electrical conductors and dielectric
6 material are microelectromechanical elements.

1 26. (Cancelled)

1 27. (Currently Amended) The switch of claim [[26]] 25, further comprising a sealed
2 chamber containing the dielectric material, the dielectric material comprising a gas.

1 28. (Original) A switch comprising:
2 conductors;
3 a dielectric material between the conductors; and
4 nanotube electron emitters electrically connected to at least one of the conductors,
5 wherein the dielectric material is adapted to break down in response to applied electrical
6 energy provided to at least one of the conductors to provide an electrically conductive path
7 between the conductors.

1 29. (Original) The switch of claim 28, wherein the dielectric material comprises a gas.

1 30. (Original) The switch of claim 29, further comprising a sealed chamber containing the
2 gas.

1 31. (Original) The switch of claim 30, further comprising a dielectric layer disposed over the
2 conductors in the sealed chamber, the dielectric layer having openings to expose respective
3 conductors.

1 32. (Original) The switch of claim 31, wherein the nanotube electron emitters are disposed
2 in at least one of the openings of the dielectric layer and in electrical contact with at least one of
3 the conductors.

1 33. (Original) A method of activating a component, comprising:
2 providing a switch having microelectromechanical elements, the microelectromechanical
3 elements comprising a sealed chamber containing at least one of a dielectric gas and dielectric
4 liquid, and conductors in the sealed chamber;
5 applying an input voltage to at least one of the conductors to cause breakdown of the at
6 least one of the dielectric gas and dielectric liquid such that an electrically conductive path
7 extends between the conductors; and
8 electrically connecting the input voltage to the component through the switch.

1 34. (Original) The method of claim 33, wherein electrically connecting the input voltage to
2 the component comprises electrically connecting the input voltage to a well device.

1 35. (Original) The method of claim 33, wherein electrically connecting the input voltage to
2 the component comprises electrically connecting the input voltage to an explosive device.

1 36. (Original) The method of claim 33, wherein electrically connecting the input voltage to
2 the component comprises electrically connecting the input voltage to at least one of an explosive
3 foil initiator, an exploding bridgewire initiator, and a semiconductor bridge initiator.

1 37. (Currently Amended) A switch comprising:
2 at least two conductors; [[and]]
3 a nanotube electron emitter to form at least part of an electrically conductive path
4 between the at least two conductors; and
5 a dielectric element adapted to ionize in response to input energy to provide another part
6 of the electrically conductive path.

1 38. (Cancelled)

1 39. (Currently Amended) The switch of claim [[38]] 37, further comprising at least another
2 nanotube electron emitter.

1 40. (Currently Amended) A method comprising:
2 activating a switch having conductors and at least one of a nanotube electron emitter and
3 a radioactive isotope electron emitter; [[and]]
4 conducting electrical current between the conductors through an electrically conducting
5 path including the at least one of the nanotube electron emitter and radioactive isotope electron
6 emitter; and
7 coupling the explosive device to the switch.

1 41. (Cancelled)

1 42. (Original) The method of claim 40, further comprising running a tool including the switch
2 into a well,
3 wherein activating the switch comprises activating the switch while the tool is in the well.